



Energy Fuels Resources (USA) Inc.  
225 Union Blvd. Suite 600  
Lakewood, CO, US, 80228  
303 974 2140  
[www.energyfuels.com](http://www.energyfuels.com)

March 30, 2023

Elizabeth Adams  
Director, Air Division  
U.S. Environmental Protection Agency, Region IX  
75 Hawthorne St.  
San Francisco, CA 94105

**Re: Annual Report for the Pinyon Plain Mine Under 40 Code of Federal Regulations (CFR) Part 61, Subpart B – National Emissions Standards for Hazardous Air Pollutants.**

Dear Ms. Adams:

Energy Fuels Resources (USA) Inc. (“EFRI”) operates the Pinyon Plain Mine (the “Mine”) located in Coconino County, Arizona. EFRI submitted an Application for Approval of Construction or Modification of a New Source under 40 CFR 61.07 (the “Application”) on July 2, 2015, which was approved by the U.S. Environmental Protection Agency on September 21, 2015. An annual report is required under 40 CFR 61.24.

In 2022, underground activities included routine maintenance and construction of underground mine infrastructure. No ore production was conducted in 2022. As of the end of 2022, the ore deposit has not been accessed or developed, and the permanent ventilation system has not been constructed. The temporary ventilation system is still in use and construction of the permanent ventilation system has not commenced. The Mine is still being ventilated using a temporary fan and ventilation tubing. Accordingly, no radon emissions of any significance are expected to be exhausted from the Mine’s ventilation system until the ore body is developed and accessed. As specified in the Application, EFRI has installed track-etch canisters at several locations at the top of the shaft and at the inlet of the temporary fan and ventilation tubing during underground activities prior to ore production. The data collected to date have confirmed that no radon of any significance has been released in the atmosphere. EFRI does not anticipate encountering any radon of any significance until the ore deposit is accessed and developed; however, because there were underground activities in 2022, EFRI is submitting this annual report for 2022.

Should you have any questions regarding this report, please contact me at (303) 389-4130.

Yours very truly,

A handwritten signature in blue ink, appearing to read 'David C. Frydenlund', is written over a blue circular stamp.

**ENERGY FUELS RESOURCES (USA) INC.**  
David C. Frydenlund  
Executive Vice President, Chief Legal Officer and Corporate Secretary

cc: S. Bakken, K. Weinel, L. Shumway, M. Germansen, J. C. App (EFRI)  
Ryder Freed, Charles Swanson (EPA)

**ENERGY FUELS RESOURCES (USA) INC.  
40 CODE OF FEDERAL REGULATIONS 61 SUBPART B**

**PINYON PLAIN MINE  
COCONINO COUNTY, ARIZONA**

**2022 ANNUAL COMPLIANCE REPORT**

**MARCH 2023**



**Energy Fuels Resources (USA) Inc.  
225 Union Blvd., Suite 600  
Lakewood, CO 80228  
303-974-2140**

**1) Name and Location of the Mine:**

Energy Fuels Resources (USA) Inc. (“EFRI”) operates the Pinyon Plain Mine (the “Mine”), in Coconino County, Arizona. The Mine site is located at the latitude/longitude coordinates 35°53’00”N, 112°05’48”W.

**2) Name of the Person Responsible for Operation and Preparer of Report:**

The owner of the unpatented mining claims at the Pinyon Plain Mine, which are located on public land managed by the USFS is:

EFRI Arizona Strip LLC  
225 Union Blvd., Suite 600  
Lakewood, CO 80228  
303.974.2140 (phone)  
303.389.4125 (fax)

The operator is:

Energy Fuels Resources (USA) Inc.  
225 Union Blvd., Suite 600  
Lakewood, CO 80228  
303.974.2140 (phone)  
303.389.4125 (fax)

**3) Model Used to Determine Compliance with Emission Standards:**

Under 40 CFR 61.22, emissions of radon-222 to the ambient air from an underground uranium mine shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent (“dose”) of 10 millirem per year (“mrem/yr”). Further, 40 CFR 61.23(a) provides that compliance with this emission standard shall be determined, and the effective dose equivalent calculated by the EPA computer code COMPLY-R.

**4) Results of the Emissions Testing and Dose Calculation:**

EFRI used Method A-7 (alpha track radon-222 detectors) to continuously collect radon-222 emissions on a monthly basis during periods of underground access prior to ore production, as contemplated by the EPA-approved July 2, 2015 Application for Construction Approval of the Canyon Uranium Mine, Coconino County, Arizona (the “Application”).

The modeled results show a dose of 0.0072 mrem/yr for the closest and most highly impacted potential receptor in the vicinity of the Mine. This dose is less than the 10 mrem/yr standard set out in 40 CFR 61.22. The COMPLY-R computer output results and the associated Arcadis Report are included as Attachment A.

**5) List of Ventilation:**

In 2022, underground activities included routine maintenance and construction of water rings in the shaft to capture water infiltrating from the Coconino Formation and, to the extent water is available, from the Kaibab Formation. No mining was conducted in 2022. Fresh air was

supplied during underground activities via ventilation tubing and a temporary fan. The air was exhausted up the production shaft. The shaft is offset from the breccia pipe and sunk through the Moenkopi Formation, Kaibab Limestone, Toroweap Formation, Coconino Sandstone, Hermit Shale and into the Upper Supai. As the shaft is in formations that do not contain uranium ore, no radon emissions of any significance were expected during 2022 activities. However, to be conservative, EFRI installed track-etch canisters to monitor for any potential radon emissions. When mining commences, drifts (i.e. tunnels) will be driven at multiple working levels from the shaft to the ore deposit, and a ventilation shaft will be completed closer to the ore deposit (i.e., within the breccia pipe).

## **6) Other Information:**

### **a) Description of Effluent Controls**

Effluent control is based on the duration of work shifts and the hours of operation of the vent fan. Fans were operated prior to and during underground access and fan hours recorded by on-site staff. Operation fan hours were used to calculate the radon emissions from the Mine.

### **b) Distances from Points of Release to the Nearest Residence, School, or Business or Office**

Distance information is provided in the computer reports and on input tables for the model inputs. Distances are calculated based upon individual mine map coordinate systems. The nearest potential receptor is at a distance of 3,361 meters to the nearest exhaust source. The nearest potential receptor which could be exposed to the highest concentration due to wind direction is located 3,361 meters to the south. These distances and receptors are shown on the figure in Attachment B. It is important to note that this nearest potential receptor is an abandoned building and is not occupied at this time. The analysis in this report is therefore conservative, because the nearest actual receptor is located further from the Mine than the nearest potential receptor.

### **c) Distances from nearest farm producing vegetables, milk, and meat**

There are no farms producing vegetables or milk in the vicinity.

### **d) Values used for other user-supplied input parameters**

In determining the most appropriate meteorological data to use in the COMPLY-R model, nine meteorological stations were identified within an approximate 50-mile radius of the Mine site, all of which were evaluated to determine if they provide meteorological data that is suitable for COMPLY-R modelling at the site.

Based on the determination presented in the Application, EFRI used the data collected at the Tusayan Airport Station at the Grand Canyon National Park (the “Grand Canyon Station”), which is located close to the site (approximately 5.6 miles) and meets all of the EPA criteria applicable for COMPLY-R modelling. None of the other eight meteorological stations satisfy all of the EPA criteria, and, as a result, none of the other stations were considered suitable for COMPLY-R modelling at the site.

### *Determination of Receptors*

Potential receptors were determined during the application process based on a careful review of satellite imagery, in conjunction with EFRI's knowledge of the surrounding areas. In identifying potential receptors, the evaluation erred on the side of inclusiveness. That is, unless EFRI had knowledge to the contrary, receptors that appeared as possible receptors were included based on a review of the satellite imagery, without verifying in each case the actual status of the possible receptor. In fact, EFRI confirmed that potential Receptor 11 currently consists of an uninhabited house and deserted airplane hangar on USFS managed land and is therefore not currently a receptor. However, personnel at the USFS have indicated that the house could still be permitted by the owner for future occupied use (although not likely during the life of the Mine). Accordingly, potential Receptor 11 was conservatively included in the dose analysis. Distance information is provided in the computer reports and on input tables for the model inputs. Distances are calculated based upon individual mine map coordinate systems. Potential Receptor 11 is at a distance of 3,361 meters to the nearest exhaust source. These distances and receptors are shown on the figure in Attachment B.

The potential receptors used in the attached COMPLY-R modeling contained in the 2015 Application are shown on the figure included in Attachment B. That modeling demonstrates that Receptor 11 constitutes the most highly impacted potential receptor. The COMPLY-R modeling results for 2022 for Receptor 11 are included with Attachment A.

Values used for other user supplied input parameters are provided in Table 2 of the Arcadis Report included as Attachment A.

## Certification

"I Certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See 18, U.S.C. 1001."

Signed: 

David C. Erydenlund

Executive Vice President, Chief Legal Officer and Corporate Secretary

Date: March 29, 2023

**ATTACHMENT A**  
**2022 Arcadis Report**

Ms. Kathy Weinel  
Director, Regulatory Compliance  
Energy Fuels Resources (USA) Inc.  
225 Union Boulevard, Suite 600  
Lakewood, CO 80228

Arcadis Canada Inc.  
121 Granton Drive  
Suite 12  
Richmond Hill  
Ontario L4B 3N4  
Tel 905 764 9380  
[www.arcadis.com](http://www.arcadis.com)

Subject:

**Pinyon Plain NESHAPs (2022)**

Date:

March 23, 2023

Dear Ms. Weinel,

Contact:

Doug Chambers

Phone:

(905) 764-9380

Email:

[Doug.Chambers@arcadis.com](mailto:Doug.Chambers@arcadis.com)

Energy Fuels Resources (USA) Inc. (EFRI) submitted an application to the United States Environmental Protection Agency (US EPA) for approval of construction or modification of a new source under 40 CFR 61.07 at the Pinyon Plain Mine (formerly called the Canyon Mine) (the "Mine") located in Coconino County Arizona on July 2, 2015. EFRI voluntarily submitted an application for approval under 40 CFR 61.07 to produce in excess of 100,000 tons of ore (EFRI 2015). The application was granted approval based on a letter dated September 21, 2015, from the US EPA provided by EFRI to Arcadis Canada Inc. (ACI).

Our ref:

30174690-01

In 2022, the Mine was ventilated periodically during March, April, and July-December. EFRI has requested Arcadis Canada Inc. (ACI) support the preparation of a National Emission Standards for Hazardous Air Pollutants (NESHAPs) radon submission for 2022. This letter report provides the COMPLY-R modelling results for the Mine for 2022.

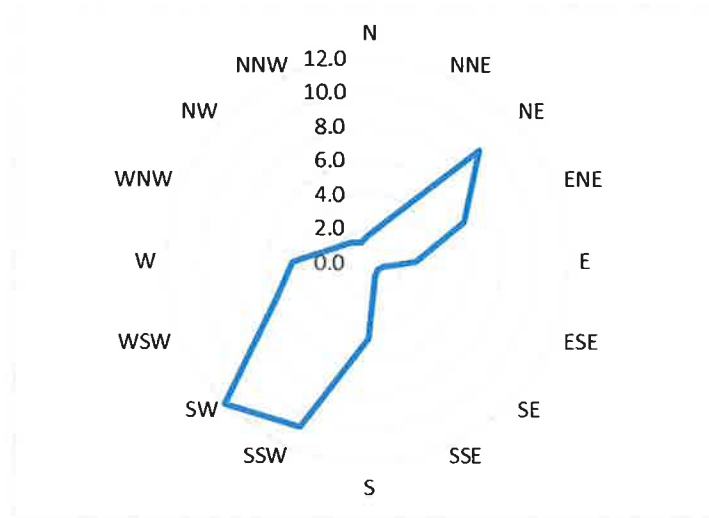
## **Meteorology**

In a memorandum prepared by Arcadis US (AUS 2015), appropriate meteorological data to use in the COMPLY-R model was identified as the data for the Tusayan Airport Station at the Grand Canyon National Park (Grand Canyon Station) located at 35.94582 °N and 112.15538 °W which is approximately 5 miles from the Site.

The Grand Canyon Station meteorological data for the period of 5 years (2018-2022) is used to construct the wind rose for the 2022 Pinyon Plain COMPLY R NESHAPs report as illustrated in Figure 1.

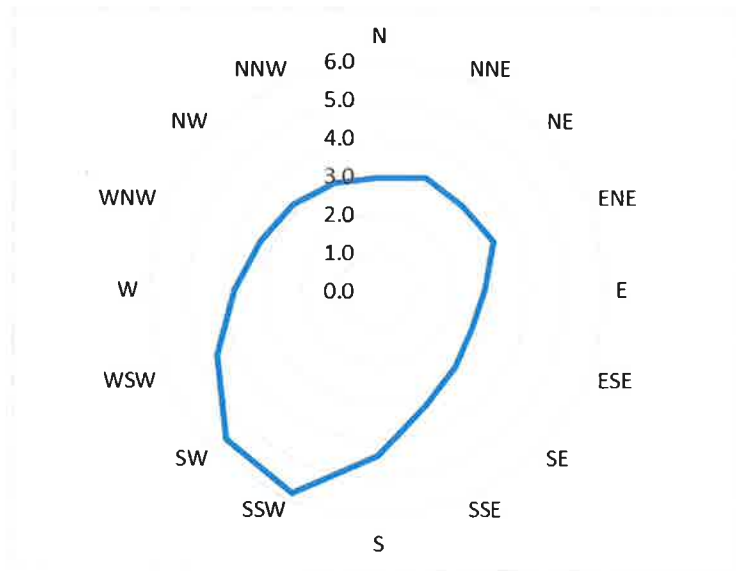


**Figure 1**      **Wind Rose Grand Canyon (2018-2022)**  
**a) Wind Direction %**



Note: This is the direction wind blows **from**

**b) Wind speed (m/s)**



Percentage Calms = 33.00%

**Source:** <http://mesowest.utah.edu/>. and <https://www.ncdc.noaa.gov/isd/>

## Radon Emissions

Radon emissions from the Mine in 2022 were monitored by alpha track etch devices. Table 1 presents the summary of the measured radon emissions for 2022 in accordance with the EPA Construction Approval received by EFRI September 21, 2015.

**Table 1 2022 Pinyon Plain Mine Radon Curie Totals**

Month	Collar (Curies)	Collar South (Curies)	Escapeway (Curies)	Vent (Curies)	Total (Curies)
Jan-22	0.00	0.00	0.00	0.00	0.06
Feb-22	0.00	0.00	0.00	0.00	0.51
Mar-22	0.03	0.03	0.00	0.00	0.00
Apr-22	0.30	0.21	0.00	0.00	0.00
May-22	0.00	0.00	0.00	0.00	0.59
Jun-22	0.00	0.00	0.00	0.00	0.42
Jul-22	0.35	0.22	0.02	0.00	1.08
Aug-22	0.23	0.18	0.01	0.00	2.42
Sep-22	0.43	0.65	0.00	0.00	1.89
Oct-22	1.35	1.06	0.01	0.00	2.40
Nov-22	1.23	0.66	0.00	0.00	0.06
Dec-22	1.64	0.75	0.01	0.00	0.51
Annual Total	5.56	3.76	0.05	0.00	9.37

The annual total radon emissions is taken as the input for the COMPLY-R modelling.

## COMPLY-R Modelling

The COMPLY- R modelling was performed using the wind rose for 2018-2022. The Mine has three contributions to its exhaust - Collar, Collar South and Escapeway, all of which are via a combined shaft and hence, for the COMPLY-R modelling, the radon was assumed to be released through a single surface vent. The source (surface vent) characteristics used for the COMPLY-R modelling are shown in Table 2.

**Table 2 Source Characteristics**

	Vent Diameter (m) <sup>a</sup>	Release Height (m) <sup>a</sup>	Vent Area (m <sup>2</sup> ) <sup>a</sup>	2022 Total Radon Released (Ci/y) <sup>b</sup>	Avg. Volumetric Flow Rate (m <sup>3</sup> /s) <sup>a</sup>
Pinyon Plain Mine Collar	1.68	2.37	2.21	9.37	11.2

a) EFRI 2015

b) ACI 2021

As discussed in EFRI 2015, Potential Receptor 11<sup>1</sup> is conservatively included as the most highly impacted receptor and is to be included in the COMPLY-R modelling for the annual reports to the US EPA. Table 3 presents the source-to-receptor distance used to create the distance files for the COMPLY-R modelling.

**Table 3 Receptor Characteristics**

Receptor Name	Meters	Direction
Potential Receptor 11	3361	S

Source: EFRI 2015

The location of receptor and wind rose frequencies used for the COMPLY-R modelling are presented in COMPLY-R output in Attachment 1.

The predicted dose for the COMPLY-R modelling was **0.0072 mrem/year** which is well below the US EPA's standard of 10 mrem/year.

We appreciate this opportunity to support EFRI and would be pleased to answer any questions that you have.

Sincerely,

**Arcadis Canada Inc.**



Douglas B. Chambers, Ph.D.  
Vice President; Senior Scientist Risk and Radioactivity;  
Director Technical Knowledge & Innovation – Radiation Services

Email: Doug.Chambers@arcadis.com  
Direct Line: 647-956-5375  
Mobile: 647-998-4984

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<sup>1</sup> Potential Receptor 11 consists of an uninhabited house and deserted airplane hangar on United States Forest Service (USFS) managed land. However, the USFS indicated the house could be permitted by the owner for future occupied use (although not likely during the life of the mine).

Ms. Kathy Weinel  
Pinyon Plain Mine  
March 23, 2023

## References

Arcadis US Inc. (AUS). 2015. *Canyon Mine Meteorological Data*. Memorandum to Energy Fuels Resources (USA) Inc. from Jo Ann Tischler. July 1, 2015.

Arcadis Canada Inc. (ACI) 2021. *Pinyon Plain Mine NESHAPs (2020)*. Memorandum to Kathy Weinel. March 23, 2021.

Energy Fuels Resources (USA) Inc. 2018. *Email to ACI Re: Pinyon Plain numbers for annual report*, from Kathy Weinel. March 15, 2018.

Energy Fuels Resources (USA) Inc. 2015. *Application for Approval of Construction or Modification Energy Fuels Resources (USA) Inc. Canyon Mine, Coconino County, Arizona*. July.

## Attachments

- 1 COMPLY-R Output

Ms. Kathy Weinel  
Pinyon Plain Mine  
March 23, 2023

# **ATTACHMENT 1**

## **COMPLY-R Output**

**Attachment 1 COMPLY-R Output**

03/15/23 06:38

40 CFR Part 61  
National Emission Standards  
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH  
THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS  
FROM THE COMPLY-R CODE, VERSION 1.2

Prepared by:

Energy Fuels Resources(USA) Inc.  
Pinyon Mine  
225 Union Blvd., Suite 600, Lakewood CO 80228

Kathy Weinel  
303-389-4134

Prepared for:

U.S. Environmental Protection Agency  
Office of Radiation Programs  
Washington, D.C. 20460

03/15/23 06:38

Stack	Release Rate (curies/YEAR)
1	9.370E+00

Release Height 2.37 meters.

Vertical momentum NOT present for vent 1

Vent diameter 1.68 meters.

Volumetric flow rate is 11.200 cu m/sec.

STACK DISTANCES, FILE: S1CAN.DAT

DIR	Distance (meters)
N	3360.0
NNE	11800.0
NE	20700.0
ENE	31600.0
E	15100.0
ESE	10600.0
SE	23400.0
SSE	8760.0
S	13300.0
SSW	100000.0
SW	29400.0
WSW	48400.0
W	24500.0
WNW	19800.0
NW	28000.0
NNW	9270.0

03/15/23 06:38

WINDROSE DATA, FILE: WINDROSE.DAT

Source of wind rose data: Grand Canyon  
Dates of coverage: 18-22  
Wind rose location: Canyon  
Distance to facility: 5mi

Percent calm: 0.33

Wind FROM -----	Frequency -----	Speed (meters/s) -----
N	0.015	2.94
NNE	0.026	3.19
NE	0.090	3.12
ENE	0.057	3.29
E	0.026	2.81
ESE	0.011	2.68
SE	0.011	2.85
SSE	0.011	3.26
S	0.045	4.37
SSW	0.105	5.78
SW	0.119	5.56
WSW	0.060	4.52
W	0.045	3.74
WNW	0.022	3.33
NW	0.016	3.15
NNW	0.012	3.04

NOTES:

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Default air temperature used (55.0 degrees F).

Default vent temperature used (55.0 degrees F).

The receptor exposed to the highest concentration is located  
3360. meters to the N.

Input parameters outside the "normal" range:

Windrose wind frequency is unusually LOW.  
Distance from vent to receptor is unusually FAR.



03/15/23 06:38

RESULTS:

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Effective dose equivalent: 7.2E-03 (mrem/year).

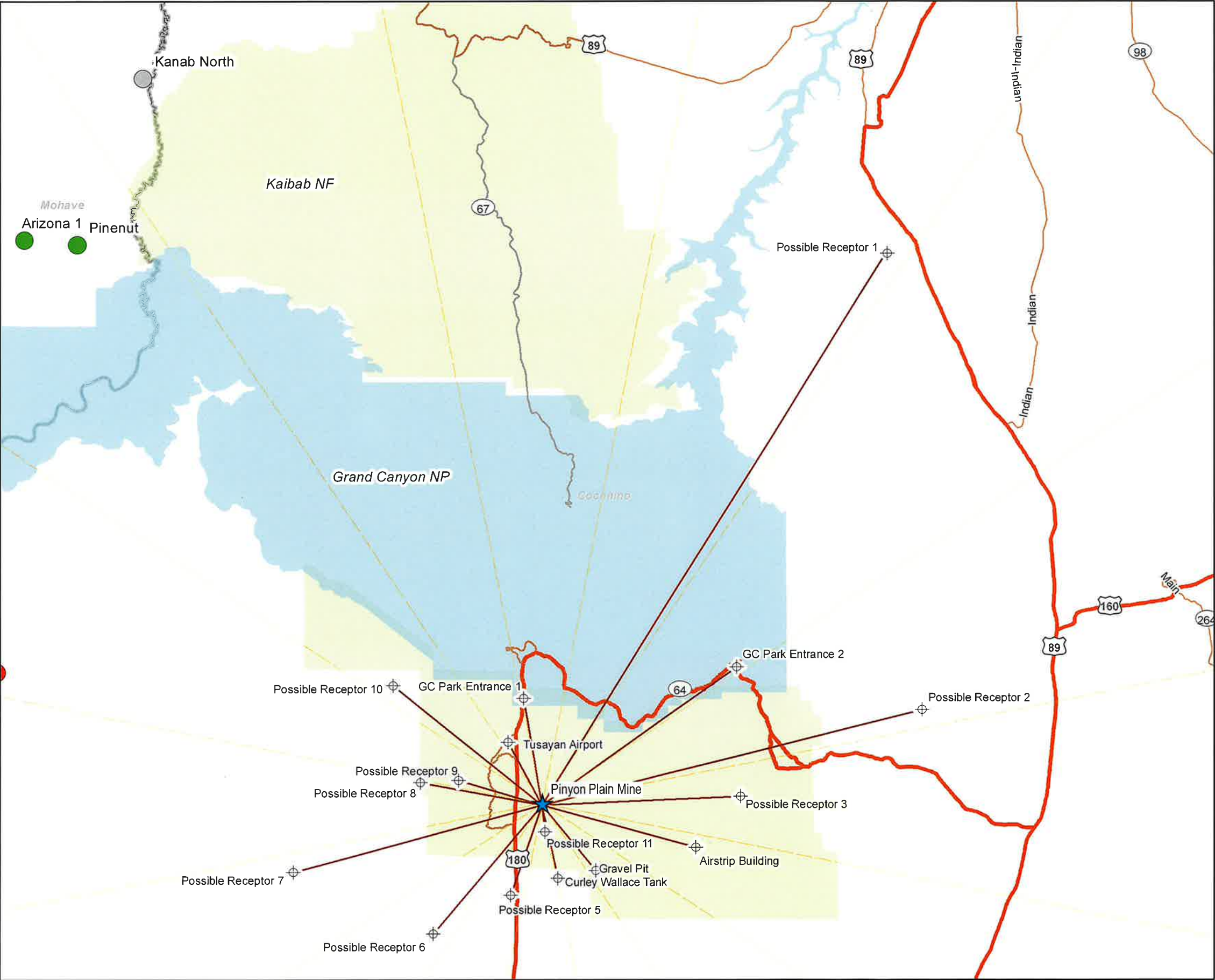
Complies with emission standards.

\*\*\* This facility is in COMPLIANCE \*\*\*

\*\*\*\*\* END OF COMPLIANCE REPORT \*\*\*\*\*

**ATTACHMENT B**  
**RECEPTOR LOCATIONS**

S:\Source\AZ\CanyonMaps\NESHAP\Figure 5 Receptor Locations 070115.mxd / 7/2/2015 11:04:07 AM by REllis

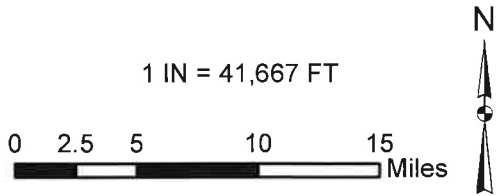


**Legend**

- ★ Pinyon Plain Mine
- Arizona 1
- Pinenut
- EZ1/EZ2, DB1, WHAT
- Wate
- Kanab North
- ⊕ Receptors
- Compass

Name	Feet	Meters	Miles	Direction
GC Park Entrance 1	43,587	13,285	8.26	N
Possible Receptor 1	262,381	79,973	49.69	NNE
GC Park Entrance 2	96,600	29,444	18.30	NE
Possible Receptor 2	158,677	48,365	30.05	ENE
Possible Receptor 3	80,459	24,524	15.24	E
Airstrip Building	64,960	19,800	12.30	ESE
Gravel Pit	34,329	10,463	6.50	SE
Curley Wallace Tank	30,429	9,275	5.76	SSE
Possible Receptor 11	11,028	3,361	2.09	S
Possible Receptor 5	38,658	11,783	7.32	SSW
Possible Receptor 6	67,784	20,661	12.84	SW
Possible Receptor 7	103,609	31,580	19.62	WSW
Possible Receptor 8	49,564	15,107	9.39	W
Possible Receptor 9	34,721	10,583	6.58	WNW
Possible Receptor 10	76,847	23,423	14.55	NW
Tusayan Airport	28,732	8,758	5.44	NNW

Coordinate System: NAD 1983 StatePlane Arizona Central  
FIPS 0202 Feet



REVISIONS	Project: PINYON PLAIN MINE		
Date: 03/21	By: DK	County: Coconino	State: Arizona
Location: Section 20 T29N R3E			
ATTACHMENT B			
RECEPTOR LOCATIONS			
Author: REllis		Date: 7/2/2015	Drafted By: REllis